

A New Species of Gymnosome, *Pneumodermopsis spoeli* (Gastropoda: Opisthobranchia), from the Great Barrier Reef, Australia

by

L. J. NEWMAN AND J. G. GREENWOOD

Zoology Department, University of Queensland, St. Lucia, Brisbane, Australia 4067

Abstract. Five specimens of a new gymnosome species, *Pneumodermopsis spoeli*, were collected in zooplankton samples from waters of Australia's Great Barrier Reef, during 1984 and 1986. Specimens are illustrated and the new species is described. Amongst its unique features is the presence of only four suckers on a bifurcated median buccal arm. Morphological comparisons are made with three closely-related species: *Pneumodermopsis paucidens* (Boas, 1886) s.s., *P. polycotyla* (Boas, 1886), and *P. teschi* van der Spoel, 1973.

INTRODUCTION

In 1984, an unusual specimen of *Pneumodermopsis* was collected off Lizard Island, northern Great Barrier Reef, Australia. Additional specimens were collected in 1986 from both Lizard and Heron islands, and the uniqueness of this new species was confirmed.

Pneumodermopsis species are rare within tropical and subtropical Australian waters. Of the 12 species known in the genus, four have been previously reported within Australian waters (VAN DER SPOEL, 1976; GREENWOOD & NEWMAN, 1985), these being *P. canephora* Pruvot-Fol, 1924, *P. macrochira* Meisenheimer, 1905, *P. paucidens* (Boas, 1886), and *P. simplex* (Boas, 1886).

The family Pneumodermatidae Pelseneer, 1887, is characterized by the presence of acetabuliferous (sucker-bearing) buccal arms that are only discernible when the buccal apparatus is extended. The number and arrangement of the suckers are species-specific. The genus *Pneumodermopsis* Keferstein, 1862, *sensu stricto* is characterized by having the following buccal structures: simple hook-sacs, lateral suckers attached to the buccal wall or on the lateral buccal arms, and a median acetabuliferous arm (VAN DER SPOEL, 1976). Previously known species have five suckers associated with the median arm, except for *P. teschi* which can show a reduction. These features are difficult if not impossible to observe in preserved specimens. We were able to observe the everted buccal apparatus in live individuals of the new species and of *P. paucidens* at research stations on the Great Barrier Reef (GBR). Comparisons

with descriptions in the literature are difficult since previous authors did not report on some of the characteristic features, their specimens being preserved and contracted.

TAXONOMY

Pneumodermopsis spoeli

Newman & Greenwood, sp. nov.

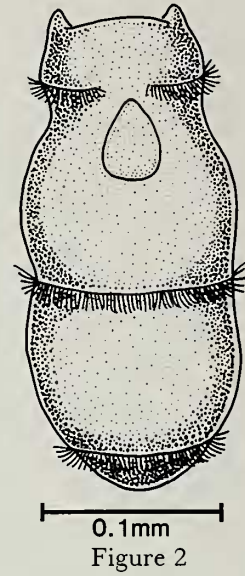
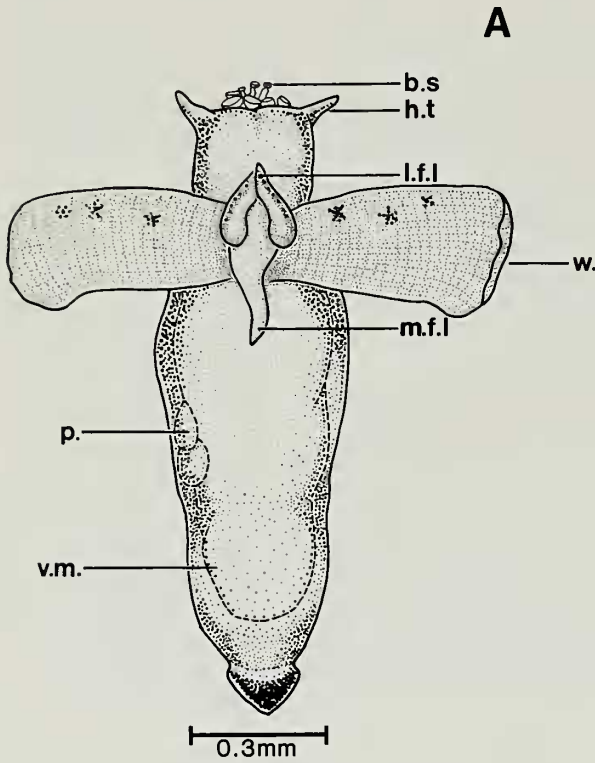
(Figures 1-3A, Table 1)

Methods: Five specimens of *Pneumodermopsis spoeli* were collected in zooplankton samples from waters of the Great Barrier Reef. Plankton tows were of 10-min duration with nets of 0.5-m diameter and mesh sizes of 0.5 and 0.2 mm. Depth of capture was 1-3 m below the surface.

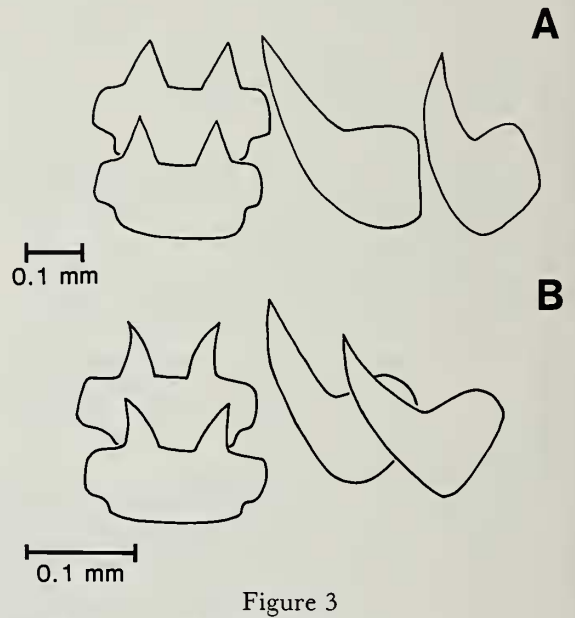
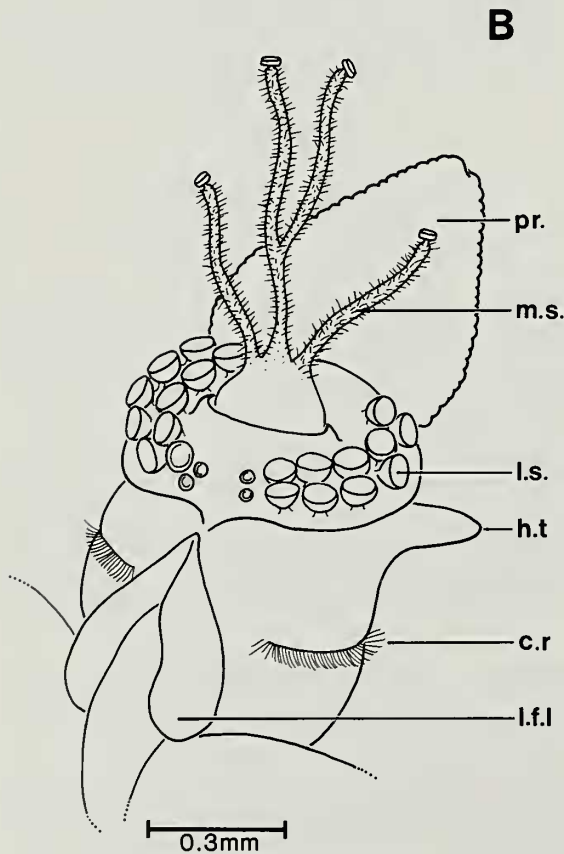
All specimens were examined, photographed, and drawn while alive in the laboratory, then relaxed with magnesium sulphate and preserved in 5% buffered formalin for later examination of the radulae and hook-sacs. Radulae were dissected from the buccal cavity, left in 10% KOH for 24 h, and mounted for light microscopy. All material has been lodged with the Australian Museum, Sydney, Australia.

Materials: Holotype: The holotype was collected on 24 December 1984 off Watson's Bay, Lizard Island, northern GBR (14°40'S, 145°26'E) (AM C153114). Body length of the live animal was 2.65 mm.

Paratypes: One specimen was collected on 25 July 1986 off Casuarina Beach, Lizard Island, northern GBR (AM C153115). Live body length was 1.5 mm. Three specimens



Polytrochous larvae of *Pneumodermopsis spoeli*.



Radulae of *Pneumodermopsis spoeli* (A) and *P. paucidens* (B).

Figure 1

Pneumodermopsis spoeli. A. Holotype, whole animal. B. Paratype, everted buccal apparatus. Abbreviations: b.s., buccal sucker; c.r., ciliary ring; h.t., head tentacle; l.f.l., lateral footlobe; l.s., lateral buccal sucker; m.f.l., median footlobe; m.s., median arm sucker; p., pericardium; pr., proboscis; v.m., visceral mass; w., wing.

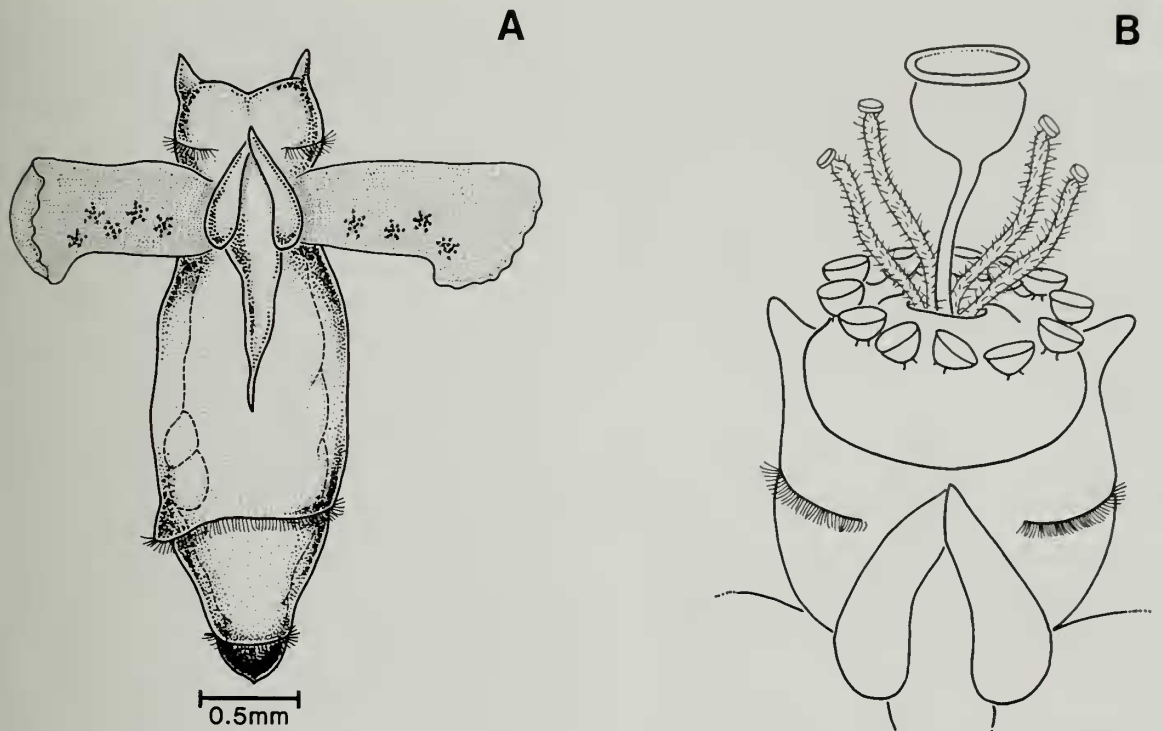
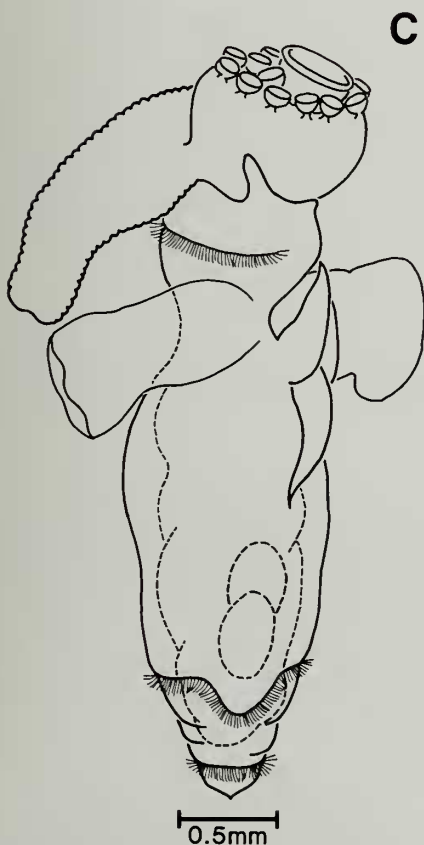


Figure 4

A. *Pneumodermopsis paucidens*, whole animal. B. Everted buccal apparatus. C. Lateral view of whole animal. Refer to Figure 1 for labels.



were collected from the channel between Heron and Wistari reefs, southern GBR (23°27'S, 151°55'E) on 8 September and 12 December 1986. Live body lengths were 1.1 mm (AM C153116), 1.0 mm (AM C153117), and 1.0 mm (AM C153118), respectively. Polytrochous larvae, assumed to be of this species, were collected from Heron Island in December 1986.

Description (Figures 1-3A, Table 1): The body is barrel-shaped when extended and rounded when contracted (Figure 1A). A posterior gill is present, but there is no lateral gill. Chromatophores are located on the head, trunk, and posterior region, and sparsely over the wings. The foot is composed of a long median lobe and two lateral lobes in close contact with each other. The internal organs, including the ovotestis, do not extend into the posterior region, terminating within two-thirds the length of the trunk.

The everted buccal wall displays 24 short, stalked suckers, with 12 suckers arranged in two parallel rows on each side of the median arm (Figure 1B). The more ventral two pairs of these suckers are small, being only half the size of the others. The median acetabuliferous arm is divided into three slender stalks, the center stalk being bifurcate. Each stalk or bifurcation is covered by fine hairlike projections and possesses a small sucker distally (Figure

Table 1

Comparisons of features of *Pneumodermopsis spoeli*, *P. paucidens*, and *P. polycotylya* (data on *P. paucidens* and *P. polycotylya* derived from VAN DER SPOEL, 1976).

Species	Characters							Distribution
	Maximum length (mm)	Lateral gill	Posterior gill	Total no. lateral arm suckers	Total no. median arm suckers	Radula formula	No. hooks in hook-sac	
<i>P. spoeli</i> , sp. nov.	2.65	absent	present	24	4	2·1·2	6	Great Barrier Reef, Australia
<i>P. paucidens</i> (Boas, 1886)	5.0	present	present	10-12	5	2-3·1·2-3	5 or 6	Indo-Pacific, Atlantic, and Mediterranean off Chile
<i>P. polycotylya</i> (Boas, 1886)	5.0	present	?	20-24	5	3·1·3	10	
<i>P. teschi</i> van der Spoel, 1973	9.0	present	absent	12-20	3 or 5	3-7·1·3-7	9-35	NE Atlantic and Mediterranean

1B). The everted proboscis can extend to the same length as the body. The radula formula is 2·1·2, the median tooth being bicuspid (Figure 3A). There are six broadly triangular hooks in each hook-sac, the maximum hook height being 0.02 mm.

Remarks: *Pneumodermopsis spoeli* is unique within the genus in the median buccal arm having only four suckers, and having a bifurcated central stalk. In overall appearance *P. spoeli* closely resembles *P. paucidens* (Boas, 1886) s.s. (Figures 4A-C) and *P. polycotylya* (Boas, 1886). *Pneumodermopsis paucidens* was first recorded from Australian waters by GREENWOOD & NEWMAN (1985).

Pneumodermopsis paucidens differs from *P. spoeli* in having a lateral gill on the right side, and the visceral mass clearly extends to the posterior region (Figures 4A, C, Table 1). The buccal apparatus of *P. paucidens* also differs in that there are only 12 stalked suckers on the buccal wall (cf. 24 in *P. spoeli*), and five median arm suckers (cf. 4); the medial sucker of the median arm is large, being at least three times the size of the buccal wall suckers (Figure 4B) (cf. absent in *P. spoeli*). The proboscis, as shown from the lateral view (Figure 4C), is highly contractile and can extend the length of the body in both *P. paucidens* and *P. spoeli*. In both species, fine hairlike projections are found on the median arm stalks. The radula formula of both species is 2·1·2, with a bicuspid central tooth. Curvature of these cusps differs slightly between the two species (Figure 3).

Pneumodermopsis polycotylya is also known from the southwestern Pacific but differs from *P. spoeli* in having a long lateral gill, five suckers on the median arm and a radula formula of 3·1·3 with a tricuspid central tooth (Table 1).

The only other species to show a reduction of median arm suckers is *Pneumodermopsis teschi*. This species differs from *P. spoeli* especially in having a well developed lateral gill, no posterior gill, and a large terminal sucker on the median arm (Table 1).

Our specimens of *Pneumodermopsis spoeli* from Heron Island were smaller than those from Lizard Island and displayed three ciliary bands (on the head, trunk, and posterior end), which are polytrochous larval characteristics (Figure 2). These specimens are considered to be juveniles because the wings and footlobes are not fully developed. Anterior and median ciliary bands are usually lost as an animal grows. However, LALLI (1972) described neoteny in the gymnosome *Paedocione doliiformis* Danforth, 1907, from the northwestern Atlantic, this possessing three ciliary bands even when in a reproductive state.

Species identification within the family Pneumodermatidae is greatly facilitated by detailed examinations of live animals and their extended buccal apparatus. In the absence of this, many species descriptions have been based on contracted preserved specimens, and are therefore often incomplete and confusing. Biological data on pneumodermatids is seriously lacking.

Etymology: The specific name *spoeli* is given in honor of Dr. S. van der Spoel of the Institute of Taxonomic Zoology, University of Amsterdam.

ACKNOWLEDGMENTS

Financial assistance was kindly provided by the Australian Biological Resource Study, the Australian Coral Reef Society, the Hawaiian Malacological Society, and the University of Queensland Research Grants Scheme. Special thanks are extended to Heron Island and Lizard Island Research Stations, to Dr. S. van der Spoel for his constructive comments and advice, and to Dr. R. Willan for his comments on an early draft of this paper.

LITERATURE CITED

- GREENWOOD, J. G. & L. J. NEWMAN. 1985. Pteropod molluscs from Australian and Papua New Guinean waters. Australian Biological Resource Study Report. 32 pp.

LALLI, C. M. 1972. Food and feeding of *Paedoclione doliiformis* Danforth, a neotenous gymnosomatous pteropod. Biol. Bull. 143:392-402.

VAN DER SPOEL, S. 1973. *Pneumodermopsis teschi* n. sp., and notes on some other Pteropoda of the "Thor" Expeditions

1903-1910 (Gastropoda). Bull. Zool. Mus. Amsterdam 3(9): 53-64.

VAN DER SPOEL, S. 1976. Pseudothecosomata, Gymnosomata and Heteropoda (Gastropoda). Bohn, Scheltema, and Holkema: Utrecht. 484 pp.